DOCUMENT RESUME

ED 438 100 PS 028 307

AUTHOR Hohmann, Charles
TITLE Foundations in Elementary Education: Overview.
INSTITUTION High/Scope Educational Research Foundation, Ypsilanti, MI.
ISBN ISBN-1-57379-005-2
PUB DATE 1996-00-00
NOTE 52p.; Videotape not available from EDRS.
AVAILABLE FROM High/Scope Press, 600 North River Street, Ypsilanti, MI 48198-2898 (Guide: AA-E3007, $10.95; Guide and video: AA-E3011SET, $15.95). Tel: 800-40-PRESS (Toll-free); Fax: 800-442-4329 (Toll Free).
PUB TYPE Guides - Non-Classroom (055) -- Non-Print Media (100)
EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Classroom Environment; Developmentally Appropriate Practices; Educational Objectives; *Elementary School Curriculum; Primary Education; *Teaching Methods
IDENTIFIERS *High Scope Model; Program Characteristics

ABSTRACT

The cornerstone of the High/Scope approach to early elementary education is the belief that active learning is fundamental to the full development of human potential and that active learning occurs most effectively in settings that provide developmentally appropriate learning opportunities. This guide and accompanying videotape are intended to acquaint parents, teachers, and administrators with the High/Scope model. The first three sections of the guide explore High/Scope's fundamental goals and purposes, psychological foundations, and organization and management of the classroom environment. The next five sections detail the High/Scope approach to instruction in language and literacy, mathematics, science, movement, and music. The guide's final section reviews evidence of the effectiveness of the approach. The guide's accompanying videotape presents classroom scenes from High/Scope programs in a range of settings, illustrating such core components of the approach as the "plan-do-review" sequence, small-group workshops, and classroom interest areas equipped for specific kinds of learning. The videotape also introduces High/Scope's guides for language and literacy, math, science, movement, and music. (HTH)

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FOUNDATIONS *in* Elementary Education

An Overview

Charles Hohmann

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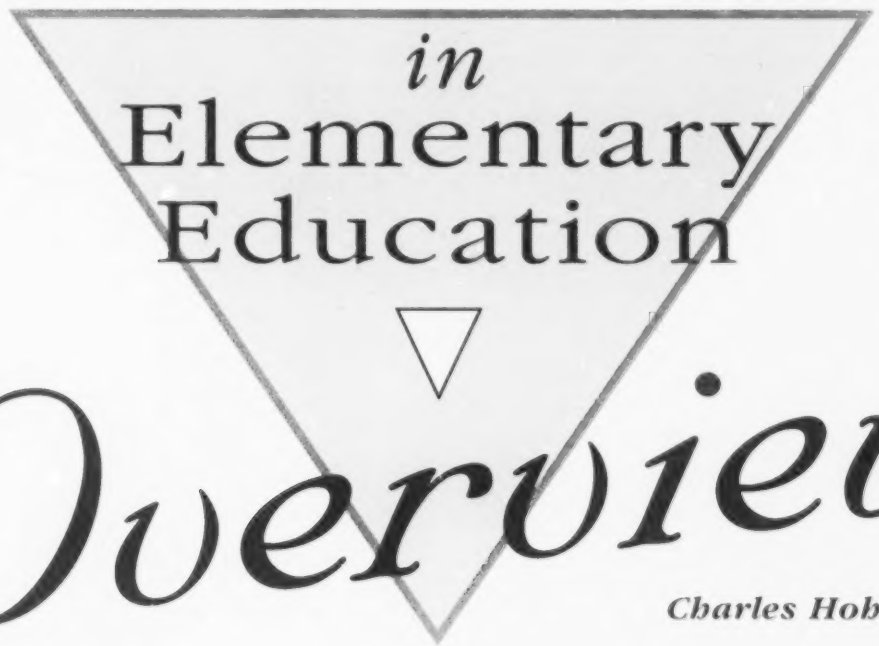

Overview

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Series Consultant:
Frank F. Blackwell

HIGH/SCOPE PRESS
YPSILANTI, MICHIGAN

Published by

HIGH/SCOPE PRESS

A division of
High/Scope Educational Research Foundation
600 North River Street
Ypsilanti, Michigan 48198-2898
313/485-2000, FAX 313/485-0704

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Library of Congress Cataloging-in-Publication Data

Hohmann, Charles, 1945–

High/Scope elementary curriculum : overview / by Charles Hohmann.

p. cm.

Includes bibliographical references and index.

ISBN 1-57379-005-2

1. Education, Elementary—United States—Curricula. 2. Active learning—United States. 3. Classroom management—United States.

I. Title.

LB1570.H59 1996

372.19'0973—dc20 96-4580

CIP

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

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Chapter 1

Fundamental Goals and Purposes

The cornerstone of the High/Scope approach to early elementary education is the belief that *active learning* is fundamental to the full development of human potential and that active learning occurs most effectively in settings that provide *developmentally appropriate learning opportunities*. This fundamental belief has guided the development of High/Scope's elementary education approach from its inception. Evolving over more than two decades of research, curriculum development, field study, and professional training efforts, the High/Scope approach to elementary education strengthens and extends the natural maturational and intellectual development of all children.

In elementary classrooms using High/Scope's approach, children engage in educationally important learning tasks by participating in developmentally appropriate *key experiences*. In addition, children and teachers form an *active learning partnership* to support the children's development in significant areas of education and to support them as they engage in important social relations with other children and adults. In all students, the High/Scope approach promotes *independent thinking, active learning,* a *"can-do" attitude,* and an *active, inquisitive imagination*. While each child will develop these attributes at different rates and in varying degrees, the High/Scope approach is designed to foster *self-confidence* and *social competence* in *all* children—skills that are necessary to function in today's society, where lifelong education, on-the-job training, teamwork, and problem solving are increasingly important. When fully implemented, the High/Scope educational approach yields long-term economic and social benefits both for the youngsters involved and for all members of society.

The High/Scope elementary approach addresses the educational challenges of today and the years ahead with its basic goals:

- **For children:** The curriculum supports sound educational practices that provide children with effective, developmentally appropriate learning experiences well suited to their diverse backgrounds, strengths, and interests.
- **For teachers and administrators:** The curriculum sets clearly defined and effective organizational, instructional, and classroom management strategies and guidelines for teachers and administrators.
- **For parents, community, and society:** The curriculum is a cost-effective investment in developmentally appropriate educational practice. It provides both short- and long-term dividends by strengthening children's character, feelings of self-worth, and personal competence; encouraging students' lifelong educational attainment; and contributing significantly to the general health and welfare of society.

The Basic Approach

The High/Scope Elementary Curriculum has adopted many of the practices of the highly successful and effective High/Scope Preschool Curriculum. The effectiveness of High/Scope's educational approach has been documented in research studies over a span of more than 20 years.[1]

Of course, the High/Scope Elementary Curriculum differs from the preschool program in that it is designed to meet the needs of children in the context of public school expectations for the elementary grades. The High/Scope Elementary Curriculum model is designed to help children meet the following objectives:

1. **Pursue interests and ideas as they**
   - Make decisions about what to do and how to do it
   - Define and solve problems
   - Exercise self-discipline, identify personal goals, and pursue and complete personally selected tasks and projects
   - Acquire a spirit of inquisitiveness and recognize the importance of establishing personal goals and values
   - Develop interests or avocations that can be cultivated both during and after completion of the school experience
2. **Live and work successfully with others as they**
   - Join with other children and adults in cooperative learning efforts, planning group projects, and pursuing shared leadership experiences
   - Comprehend the thoughts and feelings of others through spoken, written, artistic, and graphic representations
   - Acquire an openness to the viewpoints, values, and behaviors of others
3. **Exercise a wide range of intellectual and physical abilities as they**
   - Speak, read, write, dramatize, and graphically represent their experiences, feelings, and ideas
   - Apply both logical and mathematical reasoning in a variety of real-life situations
   - Develop skills and abilities in mathematics, science, art, music, and movement and use computer and related technology as tools for expressing personal talents and energy

The elementary program achieves its focus by relying on the natural progression of children's **intellectual development** in the following areas:

- Language, logic, mathematics, and science
- Spatial, temporal, and physical-motor skill development
- The creative arts
- Social studies and social-emotional development

Also, the processes of **constructive interaction,** by which intelligence develops, are essential components of the High/Scope educational approach. These processes enable adults to support and extend children's emerging intellectual and social skills as the children engage in meaningful and creative problem-solving experiences and social interactions. Moreover, teachers can use the curriculum's *classroom management strategies, instructional resources,* and *developmental framework* to encourage all types of active, creative learning activities. By promoting the curriculum's instructional goals while simultaneously supporting the children's personal interests, ideas, and abilities, teachers encourage students to become enthusiastic participants in the active learning process.

Because young children respond best to direct sensory experience, manipulation of materials and physical motor activity play crucial roles in helping them form concepts, generate ideas, and produce symbolic representations. To promote these aspects of the **active learning process,** the High/Scope Curriculum establishes a classroom environment organized around inviting learning centers stocked with practical yet appealing materials, supplies, and equipment. Moreover, the daily schedule provides frequent opportunities for children to work with materials and equipment as they devise projects of their own choosing, make thoughtful efforts to solve problems (encountered on their own or through teacher-assigned tasks), and share the results of their efforts with teachers and other children through speech, writings, drawings, or other forms of communication. Children explore materials of personal interest, express their intentions, plan courses of action, create products, offer solutions to problems they may encounter, work independently, talk freely and comfortably among themselves and with adults, see to their own needs whenever possible, and respect the needs and wishes of others.

In viewing active learning as a **knowledge-construction process,** the High/Scope Curriculum offers a set of learning objectives known as **key experiences** in such areas as language, mathematics, science, movement (physical/motor development), and music. The developmental continuum illustrated in these key experiences provides teachers with a framework for sequencing instructional materials, formulating daily plans, and assessing and tracking the children's individual and group progress. The teacher-student interaction involved in these High/Scope key experiences—teachers helping students achieve developmentally sequenced learning objectives while also encouraging them to set many of their own goals—distinguishes High/Scope's curriculum from others. In addition, by recognizing that active learning is also a **social experience** involving reciprocal interactions among both children and adults, the curriculum builds in numerous opportunities for children to engage in social processes with friends, families, and the community. Many opportunities exist for **small-group** and **one-to-one interaction** among children as well as for **child-adult interaction.** To foster development of spoken and written language, the curriculum includes many opportunities for children to use their verbal and written communication skills. It also provides cooperative learning activities both within and outside the classroom.

The Teacher's Role

Specific **planning and instructional resources** for teachers are provided in the areas of

- Arranging and equipping classroom learning areas
- Integrating technology in classroom instruction
- Planning and leading small- and large-group learning experiences in language, mathematics, science, the arts, and physical development
- Supporting, observing, recording, and reporting children's academic and social-emotional progress
- Managing the learning-center activities and projects children choose and direct themselves

High/Scope model classrooms represent educational adaptations of the theories of Jean Piaget and other notable early childhood experts (see Chapter 2 for more discussion on these influences). In keeping with Piaget's belief in the educational value of **active problem-solving with materials,** a major goal of the High/Scope Elementary Curriculum is to provide a learning environment that encourages children to work with a variety of interesting materials that lend themselves to the child's active manipulation, formulation of practical problems, and thoughtful efforts to solve them.

The High/Scope Curriculum includes regular **teacher-planned instructional activities.** *The teacher's role is to provide specific materials and challenges and to encourage, support, and extend children's explorations and discoveries.* Teachers encourage children to adopt an active, problem-solving approach to learning and help students think through and complete specific learning experiences by asking pertinent questions relating to curriculum goals.

The High/Scope Curriculum also encourages **child-initiated learning experiences** that enable children to interact cooperatively and productively with classmates and teachers. With High/Scope's unique **plan-do-review process**—a daily occurrence in High/Scope classrooms—students rely on their own experiences and interests as they plan, carry out, and review special projects and activities of their own choosing, either alone or in cooperation with others. Here, teachers play a supportive role—asking pertinent questions, describing materials, and helping children find solutions to problems. The process gives teachers important insights into each child's interests and developmental level and helps children develop a sense of responsibility and competence that contributes significantly to their self-esteem and sense of empowerment.

Teacher initiative is also vital in encouraging parents to participate in classroom events, meet with their child's teachers at regular intervals, and participate in related activities throughout the school year. For example, at the beginning of the school year High/Scope teachers invite parents to attend an "open house" session to learn about classroom equipment, the materials their children may be using, and the various classroom routines in which they participate. Parents are also invited to volunteer to assist in classroom or learning center activities and with special classroom projects. In addition, teachers alert parents to reading, writing, and other project activities that children can do at home and that provide further opportunities for meaningful parent involvement.

Looking Ahead

The fundamental goals and purposes of the High/Scope Elementary Curriculum are simple yet profound. They are simple because they ask for the realization of nothing more than the potential of the human spirit inherent in each individual; they are profound in that they recognize nothing less than the complex forces that combine to create understanding, insight, and knowledge.

In subsequent chapters, the primary elements of the High/Scope Elementary Curriculum are examined. Chapter 2 reviews the psychological foundations that are the basis of the active learning approach. In Chapter 3, we describe the principles of classroom organization and management and provide concrete suggestions for creating and sustaining an active learning environment. Chapters 4 thru 8 give a brief overview of these basic content areas: language, mathematics, science, movement, and music. Chapter 9 offers evidence of the success of the High/Scope Elementary Curriculum in relation to both short- and long-term influences on the lives of children and their families.

ENDNOTE

J. T. Bond, A. G. Smith, and J. M. Kittle, *Evaluation of Curriculum Implementation and Child Outcomes*, Annual Report, vol. 2, pt. 1 (Ypsilanti, MI: High/Scope Foundation, 1976); D. P. Weikart, C. F. Hohmann, and W. R. Rhine, "High/Scope Cognitively Oriented Curriculum Model," in *Making Schools More Effective: New Directives From Follow Through*, ed. W. R. Rhine (New York: Academic Press, 1981); L. J. Schweinhart and C. R. Wallgren, "Effects of a Follow Through Program on School Achievement," *Journal of Research in Childhood Education*, vol. 8, no. 1 (1993).

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Chapter 2

Psychological Foundations

High/Scope's approach to elementary education is based on the general developmental philosophy that an educational program should correspond to a child's individual state of development and should be compatible with the child's interests and innate predisposition to learning. This "developmental view" of children's learning has had a number of proponents in the 20th century, including Friedrich Froebel, John Dewey, Maria Montessori, Lev Vygotsky, and most notably, the Swiss psychologist and philosopher Jean Piaget and colleagues.[1]

A Philosophical Tradition

The High/Scope Elementary Curriculum falls into the progressive or cognitive-developmental approach to education. The *progressive approach* involves an interactionist theory of development (interaction between independent "internal" processes—intentions and innate mental structures—and "external" interactions) fostering higher levels of mental function. The works of Dewey, Piaget, Vygotsky, and Case[2] provide the major theoretical support for the cognitive-developmental view, which holds that the educational process is an interaction between the *goal-oriented efforts of the learner* and *external factors* that impinge on these efforts. In this view, the child constructs knowledge of the world by physically and mentally manipulating its objects and events and constructing mental representations of them. *Thus, the High/Scope Elementary Curriculum takes a distinctly cognitive rather than behavioristic view of intellectual functioning. Children participate* ***actively*** *in their education, building their knowledge and skills as they transform ideas into logical sequences of thought and action.* Children's naturally occurring internal mental processes play a central role in High/Scope's approach.

The Cognitive-Developmental Foundations: Piaget's Influence

Piaget's elaborate child development framework and work by others in areas such as early literacy development provide a solid psychological foundation on which to build an understanding of children's mental processes in a wide range of important learning areas. These areas include mathematics, science, language, physical/motor development, the creative arts, and social-emotional development.

From a Piagetian perspective, most elementary-aged children are passing through one of three consecutive developmental levels in their logical and mathematical thinking: **(1) preoperations (intuitive thinking), (2) early concrete operations,** and **(3) late concrete operations.** Piaget also identified a fourth developmental level, **formal operations (abstract thinking),** but most children generally do not reach this stage until their preteen or early teen years.

The thought processes of young children at the **preoperations** level have been described by Piaget as intuitive. This means that children draw conclusions or plan their actions on the basis of previous and immediate physical impressions. Generally, children at the intuitive stage can describe objects and actions but are not yet able to imagine the consequences of a transforming action unless they have tried it themselves or have seen it done several times.

At the **early concrete operations** level, children begin to develop the ability to accurately retain and manipulate mental images of objects and events, as long as the objects can also be manipulated physically at the same time. For example, a child can think about the problem of what makes the strongest block tower and may even consider a few of the variables involved—perhaps the size and number of blocks. But as children think through a problem like this, they rely on the *actual physical objects*—constantly experimenting with the objects as they think about the problem. Thus, concrete physical experiences are still of primary importance to children at this level of early concrete operations.

At the third, or **late concrete operations** level, children achieve a developmental milestone as their mental manipulations become more varied and complex. They become more adept at problem solving, demonstrating an ability to consider a problem by breaking it down into its subcomponents as a step towards discovering a practical solution. In addition, they develop a fuller understanding of such complex processes as measurement and have a greater capacity for coordinating two or more dimensions or aspects of a problem as, for example, in coordinating place values for ones, tens, and hundreds.

At the fourth, or **formal operations** (abstract thinking) level, children are more mature and are not tied as much to the concrete and the present in their thinking and understanding. Most children in the kindergarten and early elementary years will not yet have reached this stage of development; these mature abilities typically appear between the ages of 11 and 14, although some children may hover on the brink of level 4 in the early grades.

The Influence of Early Literacy Research

Since the early 1980s, research in language and literacy development has taken a decidedly cognitive-developmental turn. These developments have facilitated within the High/Scope framework a constructive and active learning approach to language and literacy—a trend that has appeared under the rubric of "whole language" in a variety of other instances. Many have contributed to an "emergent" view of language and literacy development including Pflaum, Teale & Sulzby, Holdaway, and Shickedanz.[1] In this view, language and particularly reading and writing are seen to emerge from essentially untutored antecedents (such as speech and goal-oriented activity) in early childhood through the child's own striving to communicate with and to understand text. This is in contrast to the highly skill-oriented direct teaching methods of language training derived prior to this within the behavioral learning paradigm.

The emergent literacy view provides a starting point for language and literacy learning that is ideal for active learning classrooms. It begins with the child's affinity for participation in direct experience and his or her desire to communicate about this experience using speech, pictures, and early attempts at writing. Corre-

spondingly, the young child approaches text such as books, labels, and signs as sources of meaning and proceeds to derive this meaning by whatever means are available.

The emergent literacy view also outlines a developmental progression of literacy forms that lead up to conventional proficiency with reading and writing but with many intermediate and approximate stages. Writing takes a central place in early literacy learning as a vehicle for expression and communication. Early forms may involve just pictures and accompanying verbalization. Later, letters and letter strings are employed as the alphabetic principle takes hold. With increasing awareness of conventional forms from environmental print, books, and various instructional experiences, children adopt increasingly conventional writing forms. Throughout, the focus is to convey or derive meaning as the conceptual content of language—thus filling out the curriculum's cognitive-developmental framework.

Summary

The foundation of the High/Scope elementary approach is shaped by the developmental psychologies of Froebel, Dewey, Piaget, emergent literacy researchers, and others, and by the cognitive-developmental school of western philosophy. This strong foundation supports an *interactionist* view of the learning process—interaction between increasingly complex goals, plans, and mental states within the learner and the events, experiences, and social interactions occurring from the outside. The active learning environment that results from this approach nurtures the child and enables educators to organize instructional content to match the developing child's interests and abilities.

ENDNOTES

[1] F. W. Froebel, *The Education of Man* (New York: Appleton, 1912); J. Dewey, *Democracy and Education* (New York: Macmillan, 1916); J. Dewey, "Progressive Education and the Science of Education," *Progressive Education* 5 (1928; reprint, C. Silberman, *The Open Classroom Reader*, 1973), 129–30; M. Montessori, *The Montessori Method* (New York: Schoken Books, 1964); L. S. Vygotsky, *Thought and Language* (Cambridge, MA: MIT Press, 1962); J. Piaget and B. Inhelder, *The Psychology of the Child* (New York: Basic Books, 1969).

[2] Dewey, *Democracy and Education*; Piaget, *Psychology of the Child*; Vygotsky, *Thought and Language*; R. Case, *Intellectual Development: Birth to Adulthood* (Orlando, FL: Academic Press, 1985).

[3] S. Pflaum, *The Development of Language and Literacy in Young Children* (Columbus, OH: Charles E. Merill, 1986); W. H. Teale and E. Sulzby, eds., *Emergent Literacy: Writing and Reading* (Norwood, NJ: Ablex, 1986); D. Holdaway, *The Foundations of Literacy* (Sydney: Ashton Scholastic, 1979); J. A. Shickedanz, *More Than ABCs: The Early Stages of Reading and Writing* (Washington, DC: National Association for the Education of Young Children, 1986).

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Chapter 3

Classroom Environment: Its Organization and Management

The High/Scope Elementary Curriculum is designed for a full-school-year program (approximately 180 full days). The classroom routine, planned to fit a typical full-day program, is designed to be managed by one teacher with approximately 25 children. Also, half-day kindergarten programs as well as nongraded and multiage programs are supported by the methods for managing the learning environment presented in this chapter.

Arranging the Physical Environment— Furniture, Equipment, Supplies

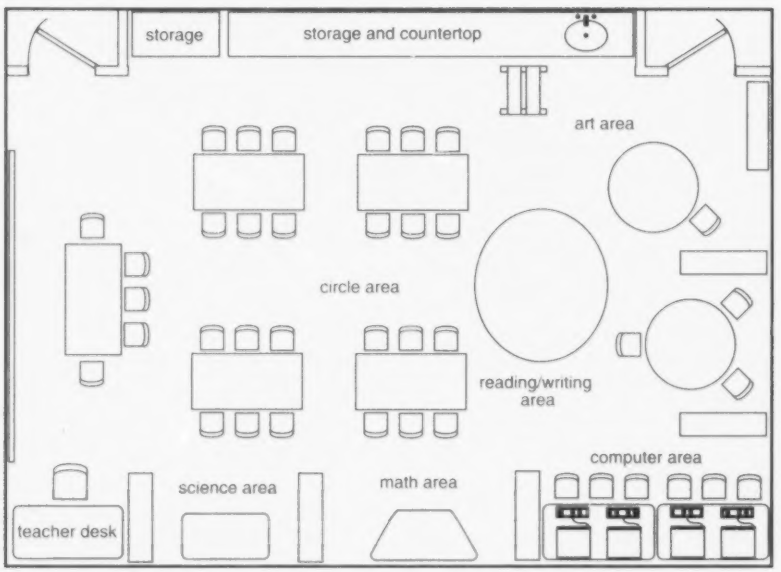
Putting the High/Scope approach into practice often requires some modifications in classroom arrangement and teaching strategies. There must be space for large-group meetings as well as space for small groups of children to meet. In addition, the room (see sample classroom on pg. 12) is arranged in designated activity centers where children can work independently on self-selected projects. The activity centers are stocked with a variety of supplies, manipulative materials, and equipment.

The High/Scope elementary educational approach also involves children in using computers and developmentally appropriate software. Computer-assisted activities support the curriculum's active, child-initiated learning emphasis and supplement the teacher's instruction in reading, writing, mathematics, science, creative arts, and problem solving. In the High/Scope classroom, computers are viewed primarily as aids to the teacher in implementing basic curriculum objectives. In light of the demanding nature of the activity-based curriculum model, each classroom is equipped with a computer center containing three or more computers. There should be enough computers so at least one third or one fourth of the class can use them at once (up to two children per computer).

Scheduling Daily Classroom Activities

Three basic components of the daily classroom routine are **large-group** or **circle activities, small-group workshops,** and independent work in activity centers during the **plan-do-review process.** Large- and small-group times lend themselves to the introduction of new materials or presentation of developmentally appropriate concepts and skills in specific academic areas. Large-group times can also be used for drama, movement and music, games, classroom project presentations, general meetings, and announcements. During plan-do-review, children undertake projects

Sample Classroom (36 ft. x 26 ft.)



they select themselves based on their own interests and the materials and equipment available in the activity centers.

The High/Scope Curriculum does not prescribe a specific order for the events that make up the classroom daily schedule. While incorporating the key elements described above, any specific schedule of particular classrooms also reflects the needs and preferences of individual teachers and the scheduling requirements of individual schools. The sample schedules presented on page 13 represent specific implementations of the High/Scope Curriculum.

The daily schedule includes time for lunch, physical education, recess, movement, music, art, and other activities that either occur outside the classroom or involve a special teacher. These activities often must be scheduled on a school-wide basis and thus may not conform to the classroom schedule. Time must be allotted within the day to accommodate such events, but whenever possible, workshops and activity periods should be preserved as unbroken units.

Activity Periods: The Plan-Do-Review Sequence

As mentioned above, the activity periods are key blocks of time in the daily routine during which children work through the **plan-do-review sequence.** Briefly, this is a sequence in which children, with the help of the teacher, initiate plans for projects or activities; work in learning centers to implement their plans; and then review what they have done with the teacher and their fellow classmates, perhaps by presenting an oral or written report, a drawing, or a dramatization. Through this process, the High/Scope Curriculum enables children to take initiative and become

Half-Day Kindergarten Sample Schedule

8:30 – 8:50	Opening/circle (song & movement)
8:50 – 9:30	Plan-do-review
9:30 – 10:30	Language/math workshop
10:30 – 11:00	Outside play/snack/ movement
11:00 – 11:30	Movement/music/story
11:30	Song & dismissal

Full-Day Kindergarten Sample Schedule

8:30 – 9:00	Opening/circle (song & movement)
9:00 – 9:45	Plan-do-review
9:45 – 10:45	Language/math workshop
10:45 – 11:15	Music & movement
11:15 – 11:45	Lunch
11:45 – 12:00	Prepare for outside
12:00 – 12:30	Outside play/movement
12:30 – 1:00	Circle or theme activity/movement
1:00 – 1:40	All read/write
1:40 – 2:00	Movement/physical education
2:00 – 2:20	Story
2:20	Song & dismissal

First Grade Sample Schedule

8:30 – 8:50	Opening (song & movement)
8:50 – 9:20	Music
9:20 – 10:30	Math workshop
10:30 – 10:45	Story time
10:45 – 11:10	Whole-group reading
11:10 – 12:10	Language workshop
12:10 – 12:35	Lunch
12:35 – 1:05	Science/social studies
1:05 – 1:35	Movement/physical education
1:35 – 2:50	Plan-do-preview
2:50	Song & dismissal

Second Grade Sample Schedule

8:10 – 8:30	Opening (song & movement)
8:30 – 9:00	Music
9:00 – 9:30	Science/social studies
9:30 – 10:15	Math workshop
10:15 – 11:05	All read
11:05 – 11:35	Movement/physical education
11:35 – 11:55	Calendar & wash-up
11:55 – 12:25	Lunch
12:25 – 12:45	Story time
12:45 – 1:45	Language workshop
1:45 – 2:50	Plan-do-review
2:50	Song & dismissal

Third Grade Sample Schedule

8:30 – 8:55	Opening (song & movement)
8:55 – 9:55	Math workshop
9:55 – 10:05	Music transition
10:05 – 10:40	Movement/physical education
10:40 – 12:20	Language workshop
12:20 – 1:05	Lunch
1:05 – 1:45	Music/science/social studies
1:45 – 2:50	Plan-do-review
2:50	Song & dismissal

responsible for their own actions. The plan-do-review sequence involves children in making choices and decisions. It also provides teachers with a structured framework within which to manage the activity period as an effective learning tool.

The activity periods present opportunities for children to use representation—speaking, writing, imitating, building, drawing—as a vehicle for employing their newly acquired knowledge and learning new concepts and skills. It should be noted that the learning opportunities during the activity periods cut across curricular areas, as children may work through different projects involving math, language, science, and art. Furthermore, the plan-do-review sequence may take place in any of the classroom activity centers, including the computer station. Teachers support children's implementation of their plans as well as their representations by engaging in appropriate dialogue with the children during these phases. In addition, they help children reflect on the outcomes of their activities at review time.

Planning allows children to consider the *what, where, when, how,* and perhaps *why* of what they will be for the next time period (or for multiple time blocks, for older children). Planning may be as simple as an oral commitment, such as "I am going to the listening center to listen to *Blueberries for Sal,*" or it may involve a written description of a project involving both art and math materials. In thinking about and planning classroom events, children develop a sense of **predictability, control,** and **ownership** of a smoothly functioning classroom routine.

"Doing" means action—working with materials, interacting with other children, choosing, creating, sharing. The active learning process of **doing** is the curriculum's way of tapping the child's innate interests and motivation. It is also a way of stimulating the child's higher order thinking abilities through the application of skills to problem-solving tasks. Doing involves building; experimenting; cooperating in games, drama, or writing projects; and using computers and materials. Planning guides the work segment by helping children structure their own activities and take responsibility for seeing them through. **Cleanup,** following each activity period, restores materials to their original places and prepares the room for the next day.

Reviewing completes the plan-do-review cycle. Reviewing (or recalling) involves putting what one has done into words or pictures and sharing the representation with other children, teachers, or parents. **Reviewing** provides opportunities to assume personal responsibility as well as to account to the teacher and to the other children. What was planned? What was accomplished? What might be done differently next time? The plan-do-review sequence best occupies a single unit of time between 45 minutes and an hour or more in length. Planning immediately precedes doing, which is immediately followed by reviewing. However, for older children, this schedule may be relaxed to allow for the most efficient use of time. For example, planning by older children may take place as soon as they arrive at school and before the beginning of other activities, such as circle time or small groups.

Workshops for Math, Language, Science, and Other Topics

Workshops are a means of harnessing the resources of the classroom computers, activity centers, and teacher-led instruction for language, mathematics, and other topic-related or integrated learning experiences. During each workshop, three or

four small groups of children, working at separate stations (including the computer area), are engaged simultaneously in different topic-related activities. The children rotate among the computer center and the small-group workshops, either within the workshop period or on subsequent days. During workshop times, teachers may focus on one or two groups while other groups work relatively independently, or they may adopt a more general focus, observing and assisting children throughout the room as needed.

The Curricular Areas

In recognition of the different and discrete aspects of human knowledge, the High/Scope Curriculum is structured to allow children to develop in accordance with their particular strengths. This approach to learning and development is in agreement with the multifaceted view of intelligence elaborated by psychologist Howard Gardner.[1] Intelligence, as defined by Gardner, is "the ability to solve problems, or to fashion products, that are valued in one or more cultural settings" (p. 191). Gardner identifies seven intelligences as major components of skilled human behavior: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal. The High/Scope Curriculum is likewise organized with the aim of helping children develop skills that are necessary to solve problems or create products, but it assigns particular significance to those skills that are functionally important in today's world. Thus, the High/Scope Curriculum incorporates seven primary curricular areas:

- Language
- Mathematics
- Science
- Fine arts
- Physical education/movement
- Music
- Social studies and social-emotional development

In concert with Gardner's view that each of the "intelligences" should have equal educational priority, the High/Scope Curriculum views each area of intelligence as a body of skills and knowledge with an underlying developmental sequence and framework. It is the aim of the High/Scope Elementary Curriculum to provide the essential teaching materials for effective support of children's learning in each of these areas.

Summary

The High/Scope Elementary Curriculum implements specific strategies for classroom arrangement and for establishing and managing the daily schedule of activities. High/Scope classrooms provide spaces for large and small groups and for materials in a variety of activity centers. Daily schedules include time for large-group activities such as circle times, for a sequence of small-group instructional

workshops, and for the plan-do-review sequence of student-selected activities. The classroom arrangement and schedule of events provide the stage upon which the curriculum activities are played out each day. The specific content of the language, math, science, movement, and music curriculum areas is discussed in more detail in Chapters 4–8.

ENDNOTE

[1]H. Gardner, "Developing the Spectrum of Human Intelligences," *Harvard Educational Review* 57(2) (1984): 187–93.

Chapter 4

Language and Literacy

After years of debate, a new and broader definition of reading has emerged, fully focused on the child as the central actor and encompassing its broader functions within language and literacy. Reading has been defined as "the process of constructing meaning from written texts . . . a complex skill requiring the coordination of a number of interrelated sources of information."[1] This definition, formulated by the National Commission on Reading, positions reading as a part of the child's general language development and not as a skill to be isolated from other areas of literacy and understanding.

Kenneth Goodman and Frank Smith[2] have described reading as a natural process involving the reader in linguistic, cognitive, and social strategies. They suggest that children approach print in a manner similar to adults—expecting it to have meaning. Yetta Goodman[3] contends that reading and writing should not be viewed as a cluster of essentially visual/perceptual skills involving unit/sound relationships. She holds, instead, that while an understanding of such relationships is one part of the picture, reading consists of perceptual, syntactic, and semantic cycles, each melting into the next as readers try to ascertain *meaning* as efficiently as possible using minimal time and energy. In fact, she concludes that "literacy develops naturally in all children in our literate society."

The naturalness of the literacy acquisition process has been viewed by Elizabeth Sulzby[4] as an emerging or developing one much like that of spoken language, which grows from inborn capacities without specific instruction. Sulzby's work shows that children know much more about reading and written language—that is, they understand the association between writing and speech, and develop their own version of literacy—all much earlier than had been previously acknowledged.

Teale and Sulzby[5] sketch the following portrait of the young child's progression toward literacy:

- For almost all children in a literate society, learning to read and write begins very early in life.
- The functions of literacy are an integral part of the child's goal-directed activity.
- Reading and writing develop together (concurrently) and interrelatedly in young children.

The English language, like other alphabetic systems, is based on "the rule-governed generation" of a large set of words with a limited number of graphemes (i.e., letter shapes). Yet, unlike some alphabetic languages, English is more demanding, because the correspondence between its sounds and letters

often breaks down. In general, though, beginning reading is a process of acquiring control over the alphabetic property of written language—a process children begin quite early in life.

While direct instruction has been proposed as the most effective method of "decoding" print into language, "whole-language" approaches, like the High/Scope approach, stress the natural acquisition of reading skills in a literacy-rich environment and consider reading to be a problem-solving activity. According to proponents of this view, including Pflaum,[6] the task of instruction in beginning reading is to establish the full range of skilled reading behaviors, with the aim of obtaining meaning and comprehension. Other theorists maintain that the child's first urge is to write and not to read, and further contend that writing not only stimulates reading but may precede it. As a foremost advocate of this view, Graves[7] has argued that children should be urged to write even more than read at the initial stages of language development.

While letter/sound relationships and accurate word identification are basic components of the process of becoming literate, they need not assume a primary position at the expense of reading or writing meaningful and authentic text. In fact, knowledge gained from environmental print and repeated storybook readings, rather than attention to letters and letter/sound correspondence in isolation from familiar print, matches more closely the developmental level of the emergent reader and writer. Pflaum concurs with this view in her observation that children display a range of beginning reading (and writing) behaviors well before the skills are fully formed and that this has resulted in "blurring the line between reading readiness and reading."[8]

Beyond this preliminary stage, children need to learn ways to extend skills in order to decipher unknown words independently. Teachers need to provide opportunities for children to proceed independently, by helping children develop the thinking and critical reading skills that provide a structure for understanding and by providing children with experiences that relate patterns of letters and sounds and also supply a variety of contextual cues. The aim is to facilitate the development of thoughtful, active readers who can approach text comprehension armed with a variety of problem-solving skills.

The High/Scope Approach

The precepts of emergent literacy development and a problem-solving approach are consistent with the overall constructivist character of the High/Scope elementary education approach, which views children as active agents who construct their own representation of the world around them in the process of working with, creating, and communicating ideas.

While language instruction in the High/Scope Elementary Curriculum primarily involves the active participation of children, it also incorporates aspects of direct instruction. Literature and computer-assisted instruction of phonics and structural analysis skills assist the teacher in meeting children's instructional needs. A wide variety of print materials and software programs have been selected to support the sequential instruction of developmentally appropriate language skills and concepts through active learning.

To involve children actively in working toward meaningful linguistic constructions, the High/Scope Curriculum attaches paramount importance to writing. Generally speaking, as expressions of their interests and current developmental levels, children's written works are of far greater importance than their spelling, punctuation, or penmanship, since the primary goal of early writing is the production and elaboration of ideas in written form. The teacher plays an important role in this process by identifying a child's interests and encouraging children to express, expand, and refine their ideas in writing. To prepare the proper environment for learning to read and write—one that encourages children to respect one another's ideas, to experiment, and to experience language in all its forms—teachers provide a print-rich classroom environment that is well stocked with a variety of writing tools. Beginning with rudimentary drawing and writing exercises in kindergarten, the High/Scope Curriculum has developed a writing program that enables the child to acquire competence, by the end of third grade, in writing stories, reports, poems, explanations, arguments. The High/Scope approach to each area of language and literacy—speaking and listening, writing, and reading—is outlined in the following key experiences:

Speaking & Listening

- **Speaking their own language or dialect**
- **Asking and answering questions**
- **Stating facts and observations in their own words**
- **Using language to solve problems**
- **Participating in singing, storytelling, poetic and dramatic activities**
- **Making and using recordings**
- **Recalling thoughts and observations in a purposeful context**
- **Acquiring, strengthening, and extending speaking and listening skills**

Writing

- **Observing the connections between spoken and written language**
- **Writing in unconventional forms**
- **Writing in conventional forms**
- **Expressing thoughts in writing**
- **Sharing writing in a purposeful context**
- **Using writing equipment (e.g., computers, typewriters)**
- **Writing in specific content areas**
- **Acquiring, strengthening, and extending writing skills**
- **Expanding the forms of composition**
- **Publishing selected compositions**

Reading

- **Experiencing varied genres of children's literature**
- **Reading own compositions**
- **Reading and listening to others read in a purposeful context**
- **Using audio and/or video recordings in reading experiences**
- **Reading in specific content areas**
- **Acquiring, strengthening, and extending specific reading skills**
- **Expanding comprehension and fluency skills**

In the language workshop, children integrate writing and reading skills into the whole fabric of learning. During the language workshop, children meet in groups to engage in a variety of literacy-related activities. Such small- and large-group meetings may involve teacher-directed instruction, independent writing, reading, listening experiences, and computer use. Reading instruction focuses on literature-based programs, adaptations of basal reading systems, and the selective use of appropriate computer software. Writing instruction, similarly, focuses on creative writing activities and teacher-child conferences to discuss what students have written.

Small- and Large-Group Sessions

Basic-skill instruction is provided by the teacher in small-group sessions. Besides instruction in basic skills, the small-group setting provides an opportunity for the teacher to confer with individual children and to review their writing or reading products and progress. Related activities, such as the development of "group" stories and participation in skill-related games, are also part of small-group time. Also, independent reading in many forms and related writing opportunities are part of learning activities throughout the day.

Large-Group Discussion

Language workshops may, on an occasional basis, provide for large-group discussions. Children may, for example, share their writing or selections from books they have enjoyed.

The Computer Center

The computer center in a High/Scope classroom serves many functions, and one of the most important functions is to give children an opportunity to develop and extend their language skills. Each day during language workshops, children engage in computerized reading and writing activities in the computer center. This computer experience includes independent writing involving word processing, reading comprehension, and phonics instruction employing the computer's ability to synthesize speech sounds. Brief teacher explanations about how to use the software during the beginning of small-group times allow children to use the computers without direct teacher supervision.

Language and Literacy During Plan-Do-Review

Many language-related experiences occur in the activity centers as part of the plan-do-review process. Depending on their developmental levels, children pursue different yet appropriate ways of extending their reading and writing experiences as they plan and then carry out independent learning activities in the activity centers. These activities may involve writing projects, such as creating new books, listening activities during which children listen to a recording of a book, or dramatic presentations based on storybooks or child-authored texts.

Summary

The action-oriented, whole-language process that characterizes the High/Scope approach to language and literacy transforms the classroom from the very start by focusing the bulk of children's energy on reading books and writing stories and maintaining this focus throughout the school year. Through small-group and computer-based instruction, ongoing review with peers and conferences with the teacher, and careful monitoring of the progress of individual children's listening, speaking, writing, and reading ability, systematic development of component skills is also assured.

ENDNOTES

[1]R. C. Anderson, E. Hiebert, J. Scott, and I. Wilkinson, *Becoming a Nation of Readers: The Report of the Commission on Reading* (Washington, D.C.: U.S. Department of Education, National Institute of Education, 1985).

[2]N. Hall, *The Emergence of Literacy* (Portsmouth, NH: Heinemann, 1987).

[3]Ibid.

[4]W. H. Teale and E. Sulzby, eds., *Emergent Literacy: Writing and Reading* (Norwood, NJ: Ablex, 1986).

[5]Ibid.

[6]S. W. Pflaum, *The Development of Language and Literacy in Young Children* (Columbus, OH: Charles E. Merrill, 1986).

[7]D. H. Graves, *Writing: Teachers and Children at Work* (Exeter, NH: Heinemann, 1983).

[8]Pflaum, *Development of Language*, 173.

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Chapter 5

Mathematics

Mathematics plays a prominent role in modern life, and an elementary curriculum must provide effective mathematics instruction so children can competently deal with mathematical concepts. Burton[1] has noted that instruction in mathematics may emphasize either the *content* (facts and skills) or the *processes* (the mode of thinking). But, as Casteneda[2] has observed, "In many programs for young children, goals of mathematics learning are stated as skills." Methods of teaching such skills typically result in instruction that stresses drill and practice with symbolic forms.

In contrast to such programs, High/Scope's constructivist approach regards mathematics as primarily involving a *set of relations that hold between abstract objects*. In this view, the "abstraction" of relations is not transmitted simply by direct instruction but by the child's *construction* of such relationships through the process of thinking in mathematical terms and of creating solutions for problems encountered in daily life.[3] Indeed, many leading mathematics educators have recognized the appropriateness of constructive methods in mathematics learning and have advocated these methods not just in the early grades but at all levels of mathematics teaching.[4]

Since children in the elementary grades learn math concepts and skills most effectively when they are actively involved and when they use physical objects in their lessons, mathematics instruction should engage the child in the world of objects and quantities and should connect the mathematical experiences thus generated with the world of numbers and symbols. To facilitate this process, developmentally appropriate programs use "manipulatives" to give children the opportunity to consider mathematical concepts and to work on the skills of counting, adding, subtracting, fractions, and statistics in ever-expanding contexts that evoke their interest and perseverance and recognize their increasing skill development. Teachers play a crucial role in enabling children to become actively involved in mathematics by providing manipulatives and frequent opportunities for their use, encouraging estimation and mental mathematics, supporting children's attempts to invent their unique solutions to problem situations, encouraging children to talk and write about mathematical experiences of genuine interest, and carefully observing each child's attempts and progress in mathematical thinking.

The High/Scope Approach

Consonant with the general goals of the curriculum, the High/Scope mathematics curriculum emphasizes individualized learning that takes place within small and large groups as well as on an independent basis. As in other content areas, to capture the inherent "excitement" of mathematics the curriculum builds on each

child's natural strengths and his or her particular interests and point of view. Mathematics instruction employs a variety of manipulatives before moving to the more abstract and symbolic forms. In addition, the High/Scope approach includes a variety of developmentally appropriate computer software programs, covering mathematical, logical, and problem-solving skills, and offers plentiful opportunities for practice sessions.

The curriculum sets forth a continuum of developmentally sequenced, elementary **key experiences** in the following domains of mathematics learning:

- **Operations on collections of objects**
- **Number and numerical operations**
- **Geometry and space**
- **Measurement of continuous quantity**
- **Movement, time, and speed**
- **Connecting with symbols and graphing**

The key experiences delineate the scope and sequence of mathematics learning in the elementary grades. Developmental sequences are coordinated across domains so that the key experiences provide a framework for planning instruction and for tracking the progress of individual children.

The Math Workshop (50–60 minutes/day)

The math workshop is scheduled for approximately one hour each day and focuses on math concepts, skill development, and problem solving. The math workshop consists of three or four small-group math activities and occasional large-group sessions. In the small groups, children work with manipulatives or computers on problem-solving tasks set out and introduced by the teacher before the workshop begins. The small-group activities occur simultaneously and children rotate from one group to another either within the hour or over several days.

Workshop activities are selected to introduce new mathematical concepts or to extend ones introduced previously. During workshops, teachers may choose to focus the majority of their attention on one small group, as others work independently, or they may provide support and assistance to children in each of the groups. A considerable variety of active, problem-solving math activities in the key experience domains has been collected in the High/Scope volume, *The High/Scope K–3 Curriculum: Mathematics*[3] and additional material of this type can be found in *Explorations,*[4] *Mathematics Their Way,*[5] and in other sources.

A classroom computer station should have three to four computers with two children at each computer—enough to accommodate one third to one fourth of the class at once. During the math workshop, groups of six to eight children share the computers and work in this area for 15 to 20 minutes before rotating to another math activity. Each computer offers a different math activity, selected by the teacher to reflect the needs and interests of the children. Software recommended in the *High/Scope Buyer's Guide to Children's Software*[6] has been selected to provide practice with basic mathematical skills, such as counting and number facts, as well as problem-solving skills involving logic, patterns, and spatial concepts.

Math During Plan-Do-Review

Independent activities planned and carried out by children during the plan-do-review sequence may relate directly to the concepts and materials introduced during small- and large-group times with the teacher. Manipulative math materials provide rich resources for independent math activities that children may extend into the plan-do-review period. More typically, however, plan-do-review activities are tasks and projects generated from children's particular interests and readily available materials. These activities integrate potential math experiences within an overall goal such as building a house or making a decorative design. It is the role of the teacher to plant the seeds that will grow into mathematical experiences in children's plan-do-review activities. This is accomplished through topics and materials the teacher selects for workshop activities, preparation of a math area and other classroom activity areas, and the teacher's identification and support of mathematical concepts in the projects children undertake.

Summary

The High/Scope approach to mathematics education builds on the constructivist viewpoint in which children's active involvement, frequent use of manipulatives, problem solving, and communication of mathematical information play prominent roles. Children encounter mathematics concepts and experiences throughout the day and particularly in small-group math workshops and through individual plan-do-review activities. Classroom computers and other equipment enhance mathematics learning by providing children with opportunities to explore mathematical concepts in interactive contexts, to participate in guided practice skills, and to develop graphing and charting abilities for communicating mathematical information.

ENDNOTES

[1]L. Burton, "Mathematical Thinking: The Struggle for Meaning," *Journal for Research in Mathematics Education* 15 (1984), 25–49.

[2]A. Casteneda, "Early Mathematics Education," in *The Early Childhood Curriculum: A Review of Current Research*, ed. C. Seefeldt (New York: Teachers College Press, 1987).

[3]C. K. Kamii and G. DeClark, *Young Children Reinvent Arithmetic* (New York: Teachers College Press, 1985).

[4]National Council of Teachers of Mathematics, *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: 1989).

[5]C. F. Hohmann, *The High/Scope K–3 Curriculum: Mathematics* (Ypsilanti, MI: High/Scope Press, 1991).

[6]B. Coombs, L. Harcourt, J. Travis, and N. Wannamaker, *Explorations* (series) (Don Mills, Ontario: Addison-Wesley, 1987).

[7]M. Baratta-Lorton, *Mathematics Their Way* (New York: Addison-Wesley, 1976).

[8]C. Hohmann, B. Carmody, and C. McCabe-Branz, *High/Scope Buyer's Guide to Children's Software* (Ypsilanti, MI: High/Scope Press, 1995).

Chapter 6

Science

Science may mean different things to different people but nevertheless is vital to us all. The working scientist or engineer views science as a set of conceptual and mathematical tools for thinking and for solving problems. The naturalist identifies science as the materials, events, and changes that have occurred during the history of our planet and universe. Science also provides the naturalist with tools for discovering and understanding these events. Historians view science as a record of ideas and discoveries—such as locating the sun, not the earth, at the center of the solar system. Many nonscientists view science as a window on worlds of wonder—outer space, ocean depths, microbes and medicine, atoms and molecules—worlds too large, too small, or otherwise too remote in space and time to view directly. For everyone, science is a source of technology for products that can make lives easier, healthier, safer, and more productive.

At the core of the diverse facets of science is a set of common concepts and processes that define what it means to think in scientific terms. Even for those who are not involved with science on a professional basis, there is a need to understand the basic concepts of science in order to understand its potential as well as its risks and limitations. As observed in *Science for All Americans*: "America has deliberately staked its future well-being on its competence—even leadership—in science and technology, . . . yet, most Americans are not scientifically literate. One only has to look at the international studies of educational performance to see that U.S. students rank near the bottom in science and mathematics."[1]

For a child, the many facets of science blend together in the world of familiar experiences and wonder. Educating a child in science is a matter of helping the child begin to move from a child's way of thinking and reasoning, from a child's concepts of materials and physical processes, to a scientific pursuit of knowledge. For children the process must be **constructive—an active learning process**—not just a gradual accumulation of scientific facts and information. We understand that young children build an understanding of phenomena of personal significance and learn science as a tool for achieving personally meaningful goals.

During the early process of science learning children make scientific discoveries by touching, tasting, sniffing, seeing, and listening, as well as by reasoning in concrete ways with objects close at hand. For the most part, children do not learn about the world around them through the hypothesizing and testing of scientific experiments (though this is an important aspect of understanding science for older children and adults). Rather, children gain early science ideas through trial-and-error problem solving in attempts to generate the results they desire. Their conceptions of materials and events are those that arise out of these direct experiences.

The High/Scope Approach

The aim of the High/Scope approach to science is to bring an active, hands-on, *"minds-on"* process to science learning for elementary-aged children that builds on the abilities and concepts emerging naturally in children of this age. Such an approach helps children develop an understanding of major concepts that explain how the world around them works and contrasts with "vocabulary-driven curricula [that] often result in science classes that resemble trivia games."[2] In the High/Scope approach, this means that science concepts and skills are made accessible to children through sensible experiences, through the reasoning typical of their age, and through the conclusions children themselves draw from such experiences. Such an approach is reflective of the belief of scientists in the American Association for the Advancement of Science that "technology education aims to provide students with ways of *dealing with* the complexity of modern life, [and] science education encourages students to *propose explanations* for observations about the natural world."[1] Science in the High/Scope approach is therefore approached as a process of inquiry—asking real questions with the expectation of obtaining an answer (the child's answer)—and is intimately connected with the initiatives of the child to understand and make things work.

The science of why and how things work, how things have come to be the way they are, is the science of systems, mechanisms, causality. Understanding causality is as simple as being able to "fix" a broken zipper or to create an arch of counterbalanced blocks. But understanding the causality of how things work quickly gets complicated—often more so than we commonly think. We are told that plants require sunlight to make food by the process of photosynthesis. Yet even molecular biologists still search for the mechanisms of how the simplest plants accomplish this remarkable feat.

The science that one does "hands-on" requires an understanding of causality—an understanding of how things work—because working hands-on means trying to make things work or to alter or control how things work. We must therefore exercise care in choosing topics for hands-on science. We must choose science topics in which children can understand the mechanisms involved and can work out this understanding through their own experiences and with concepts they already understand.

Children's fascination with the wonders in science—space travel, weather, astronomy—should be encouraged and should lead to further reading, discussion, and exploration. But such activity does not necessarily lead to an understanding of the "science" involved. Indeed, much of the science involved in such familiar topics will be beyond the grasp of elementary school children. Those activities perused in the name of science must focus on systems where children's explorations can bring them knowledge of science concepts or be structured to provide a specific focus on major science concepts.

In keeping with the constructivist and hands-on aims of the High/Scope Curriculum, children are encouraged to be actively engaged in an exploratory process that involves problem-solving activities and the discovery of patterns of regularity and causal mechanisms. In such an approach, the science process skills available to children play a central role since these define the actions children can and do perform. The High/Scope key experiences in science focus on

the following scientific processes:

- **Observing; looking with a purpose; collecting data**
- **Classifying and ordering materials according to their attributes and properties**
- **Measuring, testing, and analyzing: assessing the properties and composition of materials**
- **Observing, predicting, and controlling change: understanding causality**
- **Designing, building, fabricating, and modifying structures or materials**
- **Reporting and interpreting data and results**

Equally important to this approach to science is the selection of content —the concept domains of science—in which the actions defined by the process skills can and do lead to authentic scientific knowledge and understanding. The High/Scope approach includes science content organized under the headings of **life and environment, structure and form,** and **energy and change** and includes the following major concepts: structure, function, diversity, variation, model, scale, system, subsystem, constancy, change, cause and effect.

Science Workshops (20–45 minutes/day)

Science activities organized by the teacher and carried out by children in small, teacher-led or semi-independent groups, or in occasional large groups, typify science workshops. Science workshop activities, occurring regularly several times a week, may be integrated into language and mathematics workshops, or may occur in separate blocks of classroom time devoted exclusively to science activities.

In science workshops, children engage in hands-on science work—such as growing and observing seeds, testing materials, analyzing mixtures, making and comparing measurements, and preparing reports and projects to show what they have done. When these science activities are integrated in a language or math workshop, they are located at one of the three to four workshop areas. Small groups of children rotate among the workshop activities. When science activities are juxtaposed with language or math activities, opportunities for integration of the subject areas are especially strong (for example, writing about science experiences, measuring or graphing related to the science activity).

Small and Large Groups

When science activities are carried out in a separate block of time, they should still be carried out in small groups to maximize children's active involvement and to individualize their experiences as much as possible. However, occasional large-group science activities may be used to introduce new materials or concepts or to allow for experiences outside the classroom that must necessarily involve the whole group. Science activities suitable for use in elementary classes can be found in the High/Scope Elementary Curriculum Series volume, *Science*[4] and in the new science activity series soon to be published.[5]

Computers

Computers, suggested for extensive use in language and mathematics workshops, may also be used to provide a variety of science experiences during workshops as well as at other times of the day. A number of valuable computerized science activities are available. Computer science activities made available at a computer station during workshops or during the plan-do-review period allow children to choose to work with them on their own.

Science During Plan-Do-Review

During the plan-do-review period, children may plan to work with science materials in the science center or to use science materials in the context of a project in some other area of the classroom. Science materials and activities introduced to children during science workshops are likely to stimulate children's interest. Plan-do-review periods provide an opportunity for children to continue and expand on these interests—or to initiate science activities based on their own interests.

Summary

Science in the High/Scope Elementary Curriculum involves hands-on activities that require children to develop their constructive learning capacities. While specific times are devoted to science activities, many additional opportunities exist for integrating science with other learning experiences, such as those in language, mathematics, social studies, and the arts.

ENDNOTES

[1] F. J. Rutherford and A. Ahlgren, *Science for All Americans* (Oxford: Oxford University Press, 1990).

[2] S. Loucks-Horsley, et al., *Elementary School Science for the '90s* (Andover, MA: The Network, 1990).

[3] Ibid, p. 28.

[4] F. Blackwell and C. Hohmann, *High/Scope K–3 Curriculum Series: Science* (Ypsilanti, MI: High/Scope Press, 1991).

[5] F. Blackwell, *Science Activity Series: Book 1. Life and Environment; Book 2. Structure and Form; and Book 3. Energy and Change* (Ypsilanti, MI: High/Scope Press, in press).

Chapter 7

Movement[1]

In this age of high technology, we often find that the motor development of elementary school children has not kept pace with their cognitive development and chronological age. Their *bodily-kinesthetic intelligence* may not even have been considered for its importance; yet, as mentioned in Chapter 3, psychologist Howard Gardner[2] identifies this as one of the seven basic intelligences.

The reasons for this lag in motor development are not hard to see. With today's lifestyle, many children are bussed or driven to school instead of being encouraged or allowed to walk or ride bikes. They do not engage in as many interactive and active neighborhood games, family chores, and outdoor activities as they once did. Passive television viewing and time spent with video games seem to have replaced children's natural play. Fewer children exercise fine-motor skills in the study of piano, guitar, or violin. The emphasis on early participation in competitive sports means that children often do not have simple patterns of movement in place before advanced physical skills are taught and competition begins. The results of today's fast-changing lifestyle seem to point to children's

- Lack of awareness of what their bodies can do
- Diminished control of arms, legs, and fingers
- Need to develop gross- and fine-motor abilities
- Evident fatigue after brief periods of activity
- Need to attain physical fitness

The inclusion of movement in the High/Scope Curriculum for elementary school addresses these issues. The movement approach is based on the "Education Through Movement: Building the Foundation" program developed by Phyllis S. Weikart in over 30 years of teaching movement to learners of all ages. The guiding principles and sequencing involved are based on knowledge of child development, established motor development principles, and the program developer's many years of practical experience. There are five major goals of movement:

- To engage learners in the key experiences in movement, which are designed to develop the kinesthetic intelligence and address fundamental lifelong motor needs
- To promote active learning experiences supporting all areas of learning
- To draw from learners' existing capabilities
- To facilitate learners in developing new abilities and awareness and in constructing their own knowledge

- To create within learners a personal understanding of movement concepts and the ability to use and incorporate these concepts

The High/Scope approach to movement, like its underlying foundation, stresses a constructivist approach to motor-skill development. In every area of the High/Scope Curriculum, specific key experiences form the basis of children's skill and concept development. For example, skill in multiplication is based on exploring and experiencing activities involving sets, number, and operations. Skill in singing is based on exploring and experiencing activities involving melody, rhythm, and musical form. Movement is no exception. As an example, consider the fundamental motor skill of *jumping*. It includes the experience of *taking off* and *landing*, as well as these experiences:

- *Body awareness*—experiencing how a person's weight is first borne by one or two feet and then transferred to two feet
- *Language awareness*—experiencing how the word "jump" translates into action
- *Space awareness*—experiencing how high and in what direction the jump moves a person
- *Time awareness*—experiencing how slowly or quickly the jump is performed

Movement engages students both cognitively and physically—action, thought, and language unite to form important knowledge connections. Students can then apply their knowledge and new-found understanding of movement experiences and concepts in ways that can enhance other areas of learning. Thus, classroom teachers and physical education teachers should work together to develop the kinesthetic intelligence of each student. It is important for them to remember that movement not only is essential in its own right but also can be useful in supporting skill and concept development in many other curriculum areas.

Movement Workshops and Activities

A time set aside for purposeful movement experiences each day is critical. On some days, this time may be combined with the music time. In the elementary grades, we recommend that at least 30 minutes be devoted daily to movement and music. The nine **movement key experiences,** which are divided into three major categories, are given below.

Engaging the Learner

- **Acting upon movement directions**
- **Describing movement**

Enabling the Learner

- **Moving in nonlocomotor ways**
- **Moving in locomotor ways**
- **Moving in integrated ways**

- **Moving with objects**

Extending the Learner

- **Expressing creativity in movement**
- **Feeling and expressing steady beat**
- **Moving in sequences to a common beat**

Instead of being compartmentalized and relegated to only a specific period of the day, movement activities can flow through many other curriculum areas. Such areas as math, language, science, and social studies, for example, can be enhanced when teachers encourage children to explore new concepts through movement. Surprisingly many concepts in these various areas are motor-based or involve timing or can be given concrete meaning through movement.

Movement can be initiated by the teacher or by students for short blocks of time during transitions in the classroom, during physical education, or during art or music times. The beginning and ending of the morning or afternoon are suitable times for short movement activities.

Summary

The importance of movement experiences to both motor and intellectual functioning makes a variety of movement activities an essential part of elementary education. Classroom teachers using transition times and larger movement activity blocks can make purposeful movement an important and enjoyable part of each day. Specialists, too, using the movement teaching guidelines and movement key experiences can help develop children's movement and basic timing competence in an active learning environment.

ENDNOTES

[1]This chapter has been adapted from P. S. Weikart and E. B. Carlton, *Foundations in Elementary Education: Movement* (Ypsilanti, MI: High/Scope Press, 1995): 3–25.

[2]H. Gardner, *Frames of Mind* (New York: Basic Books, Inc., 1985).

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Chapter 8

Music[1]

In the past, music was often the first subject to be eliminated or cut back when school districts faced financial constraints. More recently, however, heeding the work of Howard Gardner[2] and others who have described musical intelligence as a *basic intelligence*, schools have included music as an important part of their instructional programs. Music and the arts are now being acknowledged as subjects that are as essential to the fabric of a high-quality curriculum as the traditional subjects have always been.

In all children, the natural elements for musical development appear very early. As a child matures, repetition and familiarity with nursery rhymes, lullabies, singing games, and songs continue to be important building blocks of his or her musical development. As the child enters school, he or she needs to continue this development by having opportunities to explore and identify sounds, listen and describe music, feel and experience beat, develop a sense of melody, feel and identify meter, and express rhythm.

High/Scope believes that children learn best about music by having their musical abilities stimulated each day and that movement can serve as the base for this learning. Music and movement are strong, natural languages that children bring to their active construction of knowledge. The classroom teacher, who knows the strengths and weaknesses of each child, is in the best position to use musical activities throughout the day, whenever they are most appropriate. Classroom teachers who are grounded in child development and learning theory can and do use this background to teach music concepts effectively. Furthermore, without the involvement of the classroom teacher, many children would have no opportunity to develop their individual musical abilities, because not every elementary school can afford to enlist a music specialist.

The High/Scope Approach

All of the key experiences in the High/Scope Elementary Curriculum combine to provide a blueprint teachers can follow to understand the breadth of the essential learning experiences for children. The **music key experiences** represent basic musical concepts to be acted upon by children as they construct meaningful music knowledge. The music key experiences are further strengthened through the implementation of **movement** as the basis for understanding musical concepts. Thus active learning experiences based on essential musical concepts plus movement facilitation provide children with opportunities for discoveries that lead to potential lifelong involvement in music activities.

The music key experiences are developmentally sequenced and are designed to enable both student- and teacher-initiated learning activities to occur.

Divided into three broad categories, the 21 music key experiences are as follows:

Exploring music

- **Moving to music**
- **Exploring and identifying sounds**
- **Exploring instruments**
- **Exploring the singing voice**
- **Listening to and describing music**

Using the elements of music

- **Feeling and expressing steady beat**
- **Identifying tone color**
- **Developing melody**
- **Labeling form**
- **Recognizing the expressive qualities of tempo and dynamics**
- **Feeling and identifying meter**
- **Expressing rhythm**
- **Adding harmony**

Creating and performing music

- **Responding to various types of music**
- **Playing instruments alone and in groups**
- **Singing alone and in groups**
- **Sharing music by performing**
- **Moving creatively and choreographing movement sequences and dances**
- **Creating and improvising songs and instrumental music**
- **Reading music**
- **Writing music**

In kindergarten and first grade, 30 minutes daily for movement and music activities with the total class is appropriate, and the elementary music key experiences have been developed with this time frame in mind. Supplementary music activities can and should be included when appropriate in language, math, science, social studies, and art experiences. Songs to begin and end the day, and songs or musical movement activities conducted throughout the day can benefit students and teachers alike.

In the higher grades, children should receive no less than two weekly music periods, with the understanding that music activities can be woven into other curriculum areas as well. In particular, part of the physical education time block should include music and movement activities.

As explained in Chapter 3, High/Scope classrooms use flexible seating and room arrangements, and these facilitate three types of musical activities occurring within the daily schedule: whole-class activities, teacher-led or independent small-group workshops, and independent activities. Many teachers establish a music activity center in their classrooms. Simple instruments such as tambourines, bongos, and kazoos can be available in such a center. Instruments such as the xylophone, recorder, piano, guitar, or autoharp are also excellent additions. Some teachers like to provide a small tape recorder in the music center, so students can record their musical performances. Students can gain a great deal of knowledge by having the opportunity to choose to work in the music center during the daily plan-do-review period. With careful planning, sound can be buffered so as not to disrupt children working in other learning centers.

Music During Plan-Do-Review

As teachers help children plan, they need to keep the children's developmental levels and past musical experiences in mind. Most children will be interested in some aspect of music, which will lead them to develop musical project plans of varying complexity. Nevertheless, some children rarely will have a musical plan in mind. For these children, teachers may on occasion suggest musical projects, propose that the child may enjoy joining another child's musical project, or ask one child to teach another child a song or activity. Teachers can talk with children about their musical plans and can also help them write out their plans. A written plan is most beneficial to the child who is unsure about what to do and who wants the adult to help set expectations.

As children become familiar with the music center, they will develop personal interests and begin extending their plans to cover longer periods of time. As they pursue their musical interests, the children will provide clues to the teacher as to what types of new materials and equipment can be added to the music activity center.

In the High/Scope classroom, **planning** and **doing** are followed by **reviewing.** Review usually takes the form of discussion, drawings, written reports, or an actual performance. The reflection/review process helps children recall the sequence and details of a music activity. It also enables children to describe how they felt about the music or activity and helps them graphically represent the music they played or the dances they performed through pictures, graphs, letters, numbers, or standard musical or dance notation. Also, music can be used to represent children's work-time experiences in other curriculum areas. For example, children can improvise "experience songs" or create music that represents the things they did in math, science, or social studies during work time.

Summary

There are many opportunities for classroom teachers to introduce young children to music's various elements. These experiences develop, strengthen, and extend each child's natural musical intelligence, especially when relevant activities are provided in an environment of developmentally appropriate active learning.

ENDNOTES

[1]This chapter has been adapted from E. B. Carlton and P. S. Weikart, *Foundations in Elementary Education: Music* (Ypsilanti, MI: High/Scope Press, 1994): 3–59.

[2]Howard Gardner, *Frames of Mind* (New York: Basic Books, Inc., 1985).

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Chapter 9

Evidence of Effectiveness

For the more than 20 years the High/Scope elementary program has been in operation in classrooms across the nation, various evaluation studies have accumulated evidence of the program's positive impact on children. All studies of the effects of the High/Scope program have been carried out in public school districts where the High/Scope Elementary Curriculum has been implemented under realistic field conditions. In 1992, the U.S. Department of Education's Program Effectiveness Panel, reviewing this evidence, certified that the High/Scope Elementary program achieves its goals and validated the High/Scope Elementary Curriculum model.[1] Briefly stated, the evidence indicates that, compared to similar students in traditional elementary classes,

- Students in High/Scope elementary classes often have significantly higher achievement test scores.

- They have richer vocabularies and write longer, more descriptive, more effective reports. Even a year after completing the program, they more frequently initiate reading and writing activities and have better attitudes towards reading and writing.

- They spend more time working in small groups and more time talking and working with adults individually.

Earlier, the federal Joint Dissemination and Review Panel, predecessor to the U.S. Department of Education's Program Effectiveness Panel, acknowledged the effectiveness of High/Scope programs in Leflore County, Mississippi[2] (1977), Okaloosa County, Florida[3] (1979), and Public School 92 in the Manhattan borough of New York City[4] (1979) because students in these districts had significantly higher achievement-test scores than similar comparison classes and comparable national norm samples.

The Evidence

The evaluation studies of the High/Scope Elementary Curriculum have at various times focused on different aspects of the program and its operation. Although standardized achievement tests were used in several studies, these measures have never been viewed as sufficiently broad to address the full range of curriculum objectives. Additional measures, including those of children's writing development and of classroom interactions and program implementation, were developed to understand the program's impact on children and the schools they attend and why outcomes can vary from one site to another. Evaluation studies were designed to examine such areas as classroom processes and program implementation, children's writing and attitudes toward reading, and the program's impact on standardized measures of academic achievement. In this chapter, we look briefly at studies conducted in several areas and present representative results in each.

Classroom Processes and Program Implementation

Building on time-sampling classroom observation systems, two observation systems, the SCOTE and SCOPE, were developed in 1972 and used for studies of the classroom process in High/Scope and non-High/Scope classrooms. From 1973 to 1974 trained observers spent two days in classrooms observing children and recording behaviors in predetermined categories on a timed schedule throughout the day. The findings revealed important differences between High/Scope and non-High/Scope classrooms on behaviors that are consistent with objectives of the High/Scope program.[3] For example, findings of High/Scope children as compared to non-High/Scope children show that **children** in High/Scope classrooms

- Spent more time interacting with adults and less time simply listening to them
- Spent more time interacting with other children while engaged in individual or joint work
- Spent more time reading and writing their own material (as opposed to commercial or teacher-created materials)
- Spent more time working and interacting in small groups (3–10 children)

Teachers in High/Scope classes

- Spent more time interacting with children individually
- Spent more time working jointly with children on projects
- Spent more time listening to children
- Spent less time using commercial curriculum materials

Stallings and Koskowits conducted a broader study of Follow Through programs using observation instruments of their own design. They also found higher levels of child initiative and purposeful child activity in High/Scope as compared to non-High/Scope classrooms.[4]

Additional implementation studies[5] have also employed direct classroom observation for assessing program operations. Curriculum implementation checklists designed for use by teachers, curriculum coordinators, principals, and trainers have been adapted for the implementation studies. The checklists focus on specific components of the curriculum such as classroom environment, instructional methods, and adult-child interaction processes. The implementation checklists, now called *Program Implementation Profiles for Elementary Grades*, provided useful measures of program implementation, yielding results based on the judgments of experienced trainers and curriculum coordinators. The checklists have also provided feedback and self-study tools for teachers as they implement the High/Scope Curriculum.

The implementation studies have highlighted the relationship between successful training efforts and high degrees of program implementation. In addition, the implementation studies show a positive correlation between strength of writing outcomes (see next section) and degree or program of implementation, with the strongest writing outcomes occurring in sites where implementation was highest.

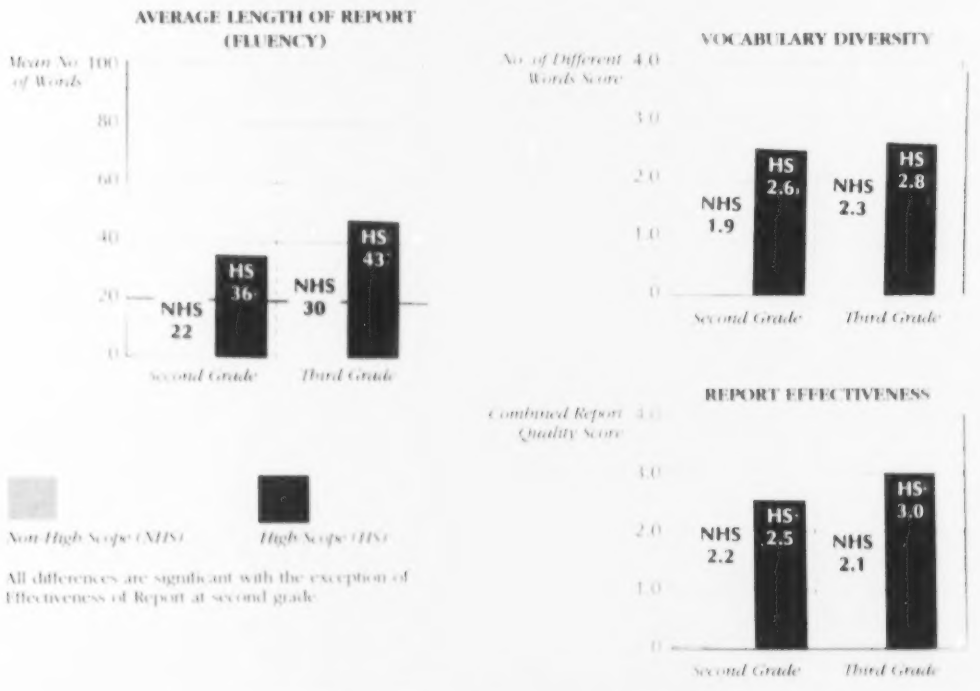
Program Outcomes

Children's Writing

The High/Scope Elementary Curriculum supports children's writing through a variety of whole-language and active learning experiences. Several studies of children's writing were undertaken in the late 1970s to determine curriculum impact in this area. Using process writing instruments of High/Scope design in which writing samples generated by individual children were analyzed for such dimensions of writing development as fluency, syntactic maturity, vocabulary diversity, and narrative organization, children in High/Scope classrooms demonstrated superior report writing and story development abilities when compared with children in non-High/Scope classes. By second grade, children in High/Scope classes wrote significantly more words, used more different words, and used more descriptive words in their reports than did non-High/Scope children. By third grade, High/Scope children wrote significantly longer and more effective reports than did non-High/Scope children (see Figure 1). In addition, a further study of

Figure 1

PLAT Written Reporting Task:
High/Scope and Non-High/Scope Differences in Report Length, Vocabulary Diversity, and Report Effectiveness by Grade Level



Source: Data from the Leflore County, Mississippi, Follow Through Program, 1977.

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children's attitudes toward reading and writing at grade 4 demonstrated that children who had experienced the High/Scope program in grades K through 3 had more positive attitudes toward reading and writing and initiated these activities more frequently than did comparison children without the High/Scope experience.

Standardized Achievement Tests

As noted earlier, the Office of Education's Joint Dissemination and Review Panel approved the High/Scope Elementary Curriculum at three sites where long-term data collection and suitable comparison groups provided an adequate research base. These sites were P.S. 92 in New York City, Okaloosa County in Florida, and Leflore County in Mississippi. These three sites were chosen because of evidence that children in these programs had improved their achievement test scores and had achieved other positive outcomes, including improved writing ability and reduced rates of retention in grade both during and after involvement in the High/Scope Curriculum.

The 1988–91 High/Scope Follow Through Evaluation

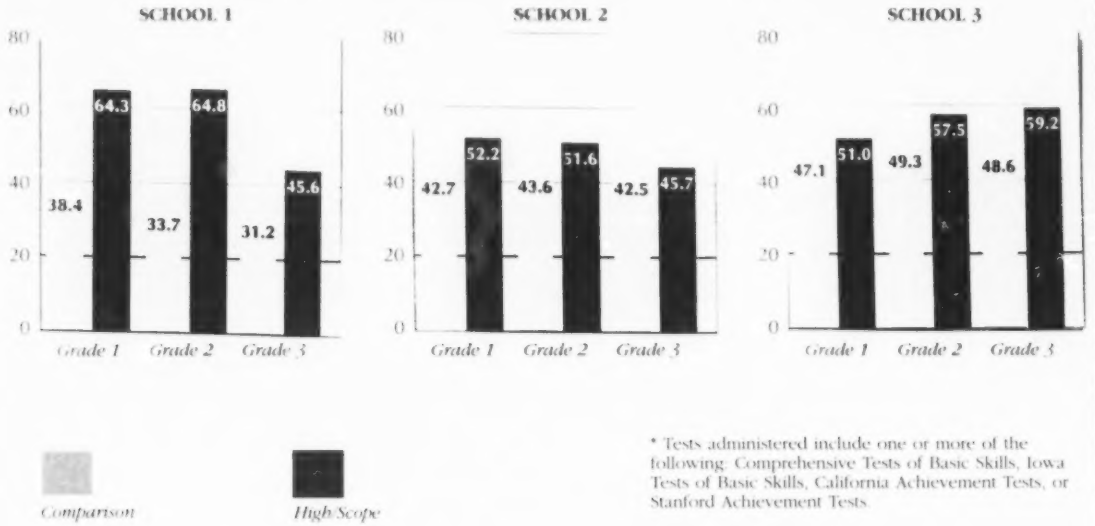
The 1988–91 Follow Through Program funding guidelines required evaluations based on achievement tests, so the High/Scope Foundation conducted a study[8] of the school achievement of the classes at three public elementary schools under its sponsorship. The study relied on the standardized achievement test required by the school districts. This test assessed outcomes in reading, language, mathematics, science, and social studies, but did not assess other important curriculum goals, such as initiative, social relations, creative writing, artistry, music, movement, and general logical thinking. However, a tight budget and lack of a suitably developed observational system precluded the systematic observation of classrooms in this study. Thus, the evaluation was forced to ignore some important curriculum goals, focusing exclusively on aspects of school achievement that continue to be of central importance in American schools.

The schools in the study were Southside School in Okaloosa County, Florida; Fairfield Court School in Richmond, Virginia; and Amanda Elzy School in Leflore County, Mississippi. Kindergarten-through-third-grade classes in these schools implemented the High/Scope Curriculum, involved parents, provided children with access to health care, and provided families with access to social services. In Florida the High/Scope children at each grade were compared to children in other classes at the same school; in Virginia and Mississippi children were compared to other children in similar classes at other schools. Except for kindergarten, most classes in the study completed and provided standardized achievement test scores. A total of 3,073 children participated in the study. Where possible, demographic background variables were used in analyses of covariance to statistically adjust outcomes, rendering fairer comparisons. An average of 1,024 children per year participated in the study—averages of 309 at Southside, 535 children at Fairfield Court, and 180 at Elzy.

As shown in Figure 2, at the three sites over the three years of the study, all the High/Scope groups scored significantly higher than the comparison groups.

Figure 2

Summary of Scores of Various Standardized Tests*
Administered to High/Scope vs. Non-High/Scope Groups at Three Sites, 1989–1991



* Tests administered include one or more of the following: Comprehensive Tests of Basic Skills, Iowa Tests of Basic Skills, California Achievement Tests, or Stanford Achievement Tests.

Summary

Evidence of the impact of the High/Scope Elementary Curriculum, collected over two decades, illustrates its effectiveness. Through a variety of studies, High/Scope children have demonstrated improvements in writing, reading, and overall achievement when compared with similar children not in the High/Scope program. In addition, High/Scope children spend more time in small groups and are more likely to initiate writing and reading activities even a year after they leave High/Scope classes. What is most important, however, is that the High/Scope Elementary Curriculum is achieving its goals for active and productive children.

ENDNOTES

[1] L. J. Schweinhart, *Validation of the High/Scope K–3 Curriculum* (Proposal to the Program Effectiveness Panel, U.S. Office of Education) (Ypsilanti, MI: High/Scope Foundation, 1994).

[2] Leflore County, Mississippi, Follow Through Program, *The Leflore County, Mississippi, Follow Through Program* (Submission to the Joint Dissemination Review Panel: Greenwood, MS: Author, 1977).

[3] Okaloosa County Follow Through Program, *The Okaloosa County Follow Through Program,* (Submission to the Joint Dissemination Review Panel) (Fort Walton Beach, FL: Author, 1979).

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[4]Public School 92, Manhattan, Follow Through Program, *The Public School 92, Manhattan, Follow Through Program* (Submission to the Joint Dissemination Review Panel) (New York: Author, 1979).

[5]M. Morris, *Classroom Observation Study of Teacher and Child Interactions in Three Follow Through Sites* (Ypsilanti, MI: High/Scope Foundation, 1974).

[6]J. A. Stallings and D. H. Kaskowits, *Follow Through Classroom Observation Evaluation 1972–73* (Menlo Park, CA: Stanford Research Institute, 1974).

[7]C. Hohmann, A. Smith, L. Tamor, and J. Kittle, *A Synthesis of 10 Years' Experience in Follow Through*, in "Annual Report: Cognitively Oriented Curriculum Project Follow Through" (Ypsilanti, MI: High/Scope Foundation, 1979).

[8]L. J. Schweinhart and C. W. Wallgren, "Effects of a Follow Through Program on School Achievement," *Journal of Research in Childhood Education* 8, no. 1 (1993).

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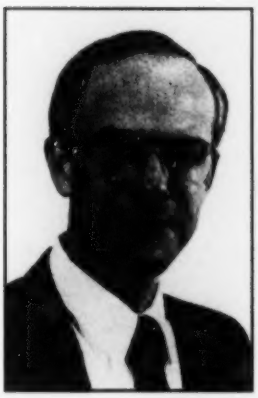
About the Author



Educational psychologist **Charles Hohmann** has been a leader in the development of the High/Scope Elementary Curriculum from 1972 to the present. During this time he has been deeply involved in elementary staff development through such projects as National Follow Through, Native American School Improvement through the Bureau of Indian Affairs, the High/Scope IBM Technology Demonstration Partnerships, and various High/Scope teacher education programs. He conducts workshops for educators throughout the United States on elementary education and on the integration of technology in elementary and preschool programs. In addition, Dr. Hohmann has developed mathematics and science learning activities for High/Scope programs serving preschoolers, school-aged children, and teens. He is the author of the *Mathematics* volume in High/Scope's Elementary Curriculum Series and coauthor of the *Science* volume. He is also the author of *Young Children & Computers; High/Scope Buyer's Guide to Children's Software,* Eleventh Edition; and High/Scope's computerized child assessment software, the High/Scope Observation Record (COR) for computers (the COR-PC and the COR-Mac).

FOUNDATIONS in Elementary Education

An Overview

CHARLES HOHMANN

This book provides a broad overview of the fundamental goals and purposes of the High/Scope Elementary Curriculum. Included are discussions of the key elements of the High/Scope approach to elementary education: the **psychological foundations** that are the basis of High/Scope's active learning approach; **general principles of classroom organization and management;** the **basic content areas** and **key experiences** for language and literacy, mathematics, science, movement, and music; and the **short- and long-term benefits** of the High/Scope approach for both children and their families.

This overview offers information on how to use the High/Scope Elementary Curriculum to organize, guide, and implement teaching and learning in elementary classrooms. Based on more than two decades of research, curriculum development, field study, and professional training efforts, the High/Scope elementary approach addresses the educational challenges of today and the years ahead by promoting independent thinking, active learning, self-confidence, and social competence in all children.

HIGH/SCOPE PRESS

A division of the High/Scope Educational Research Foundation
600 North River Street, Ypsilanti, Michigan 48198-2898

ORDERS: Phone (800) 40-PRESS FAX (800) 442-4FAX

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ISBN 1-57379-005-2